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| 09/611,635 | 07/07/2000 | Akira Koguchi | 19937-20018.00 | 6463 |

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EXAMINER

SHAPIRO, JEFFERY A

| | |
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| ART UNIT | PAPER NUMBER |
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3653

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/611,635

Applicant(s)

KOGUCHI, AKIRA

Examiner

Jeffrey A. Shapiro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-25 is/are pending in the application.
- 4a) Of the above claim(s) 16-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-15, 24 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear in line 3 of Claim 14, what "an external" refers to, as the term external is generally considered to be an adjective.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 6-9, 14, 15, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. Iwasaki et al discloses the apparatus as follows.

As described in Claim 24;

1. a plurality of stages ((32) or (96), for example), on each of which a container for containing substrates (40) therein is to be placed;
2. a first section at which the substrates are taken out from the container and/or are put into the container (32); (Note that element (32)

has a first section, table or shelf-like in appearance, where substrates may be removed or placed into the container.)

3. wherein a first stage amongst the stages is provided at the first section;

4. a movable table ((38), (104) or (98)) carrying the container between the first stage and another stage, while the container is placed thereon;

5. each of the stages has a cut-away area (100) extending from one end of the stage at least to a portion of the stage on which the container is to be placed;

6. wherein a portion of the cut-away area corresponding to the portion of the stage on which the container is to be placed has a shape that allows the movable table to move vertically through the portion of the cut-away area (see figure 4, noting vertical direction arrows near elements (90 and 92));

(Note also that SMIF pods, which are standard wafer cassettes used in manufacturing semiconductor wafers, are necessarily loaded from the bottom, and require a port through which the wafers are moved in a vertical direction. See Bonora et al, US 5,586,585, US 5,931,631 and US 6,135,698, Rosenquist, Tullis et al for example.)

As described in Claim 24;

6a. *the first section is a section where the substrates are taken out from the container and are put into the container; (Again, see figure 4, in which*

cutaway (100) allows cassettes to be moved into and out of the storage area, and also from one stage to another, where the cassettes may be either emptied or filled. The same is true of shelf (98). See also windows (118).

6b. *said apparatus further comprising a processing unit that performs a treatment on the substrate taken out from the container at the first section; (Note that a process can be reasonably broadly construed to include any type of activity that does work on the substrate, including the process of moving them, since moving a substrate is a form of treatment of the substrates. In addition, any type of process or treatment would be expected since the reason for movement of said cassettes and substrates is to move them through a wafer manufacturing facility and associated processes.)*

As described in Claim 3;

7. a horizontal moving mechanism horizontally moving the movable table between a first position adjacent to the portion of the stage on which the container is to be placed and a second position apart from the stage;

8. a lifting mechanism vertically moving the movable table;

(See figure 5, noting vertical and horizontal direction arrows)

As described in Claim 6;

9. a second section (32, 36 or 84) at which the container is received from outside the apparatus and/or is delivered to outside the apparatus

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therefrom (note that it is inherent that wafer cassettes would be exchanged on any of the sections (32, 36 or 84) with robots or other devices from outside);

As described in Claims 7 and 8;

10a. *the container is received from outside the apparatus and/or is made available for delivery to a source outside the apparatus (see discussion of Claim 6);*

10b. a moving mechanism (38 or 104) moving the movable table (note that elements (38 or 104) are necessarily made to move, otherwise the apparatus of Iwasaki et al would not work);

11. a second section (88 or 98, for example) at which the container is received from outside the apparatus and/or is delivered to outside the apparatus therefrom,

12. wherein a second stage amongst the stages is provided at the second section (note that (98) is at a higher level than (88))—(also note that there are two sections (84) in which one or both could also be construed as a second stage or a second section);

13. wherein the moving mechanism is disposed on a level lower than that of the first and second stages (note that the moving mechanism is necessarily located at a level below all stages so as to effectively move said stages)—(note also that the moving mechanism (104), for example, moves above and below both stages (84) as well as stage or section

(98))—(note also that stocker crane (80) may also be construed as a second stage or section);

As described in Claim 8;

14. a first shutter isolating the second section from outside the apparatus to inhibit access to the second section from outside the apparatus;

15. a second shutter disposed on a side opposite, with respect to the second section, to a side on which the first shutter is disposed; (Note that at the very least, it is inherent that a shutter is used to isolate wafer cassettes from the environment, since load locks and isolation from various environments are a necessary part of the semiconductor wafer production process (see Ono et al, door (152), and Lafond, doors (812A and 812B));

As described in Claim 9;

16. a controller (50, 54, 52, 58, 60, 64 and 66) controlling operations of the first and the second shutters so that the second shutter is closed when the second shutter is opened; (Note that it is, at the very least, inherent that shutters would be controlled by said controller in such a manner so as to isolate the cassettes in the particular chamber known as a "load-lock" from environment to environment.)

As described in Claim 14;

17a. *said apparatus is an integrated unit, and wherein the second section is a section where the container is received from an external of the apparatus; (Note that these limitations may be reasonably broadly construed to include the entire manufacturing system illustrated in figure 1 as "the apparatus". Note also that all elements (32, 34, 36 and 38 necessarily exchange wafer cassettes between themselves and other elements, and that the entire manufacturing system illustrated in figure 1 necessarily exchanges wafer cassettes with external areas.)*

17b. *a second stage (98);*

18. *a third section (42) or (80);*

18b. *said apparatus further comprising a third stage on which a container for containing substrates therein is to be placed, provided in a third section of said apparatus (note that either (42) or (80) may be construed to be a third stage, based on the limitations and arguments of 17a as well as the limitations of 18b),*

18c. *the third section is a section where the container is delivered to the external of the apparatus therefrom (note also that either of elements (84) may also be construed to be a third stage, with either (104) or (80) or (98) being a second stage), or that one half of (84), element (86), for example, may be construed as a first stage and the other (element 88) a third stage, or that element (116) can be construed as a third stage);*

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18d. *the third stage has a cutaway area extending from one end of the stage, the cutaway area permitting the movable table to move vertically through the cutaway area in order to lift the container from the third stage and withdraw the movable thus lifted from above the third stage (note again the window (100));*

18e. wherein the moving table transports the container between the first, second and third stages;

As described in Claim 15;

19. a passage means (100) through which the moving table moves and transports the container between the first stage and another stage *or a second stage;*

5. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al in view of Ono et al.

Iwasaki et al discloses the apparatus as described above. Iwasaki et al further discloses the following.

As described in Claim 4;

9. the horizontal moving mechanism (140) has a guide rail (156) that guides the movable table for a horizontal movement thereof (note that it is, at the very least, inherent that a guide rail, or functional equivalent thereof is provided);

Iwasaki et al does not expressly disclose the following.

As described in Claim 4;

10. a turning mechanism turning the guide rail in a horizontal plane between a first position where at least a portion of the guide rail is located below the portion of the stage on which the container is to be placed and a second position where the guide rail is withdrawn from a space below the stage;

As described in Claim 5;

11. a second horizontal moving mechanism capable of moving the table together with the horizontal moving mechanism and the lifting mechanism to a position adjacent to each of the stages;

Ono et al discloses the following.

As described in Claim 4;

10. a turning mechanism (110) turning the guide rail (b1) in a horizontal plane between a first position where at least a portion of the guide rail is located below the portion of the stage on which the container is to be placed and a second position where the guide rail is withdrawn from a space below the stage (note also that cylinder (72) extends and retracts as well as rotates about its axis);

As described in Claim 5;

11. a second horizontal moving mechanism (72) capable of moving the table together with the horizontal moving mechanism and the lifting

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mechanism to a position adjacent to each of the stages (note also that cylinder (72) extends and retracts as well as rotates about its axis);

Both Ono et al and Iwasaki et al are analogous art because they concern movement and storage of wafer cassettes.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to have used the lifting and turning mechanisms of Ono et al to articulate the various individual tables at various stages in the apparatus of Iwasaki et al.

The suggestion/motivation for doing so would have been to articulate the stages of Iwasaki et al in various directions so as to line up wafer cassettes with their targeted stages. See Claim 1, lines 23-29 of col. 18, for example.

Therefore, it would have been obvious to combine Ono et al and Iwasaki et al to obtain the invention as described in Claims 4 and 5.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al in view of Kondo et al.

Iwasaki et al discloses the apparatus as described above. Iwasaki et al does not expressly disclose the following.

As described in Claims 10-13;

20. a sensing device provided at the movable table and inspecting a condition of the substrates contained in the container, the number of substrates in the container, and whether or not there is any jump slot (empty slot) in the carrier;

21. a second sensor;

Kondo et al discloses the following.

As described in Claims 10-13;

20. a sensing device (11c) provided at the movable table (12a) and inspecting a condition of the substrates contained in the container, the number of substrates in the container, and whether or not there is any jump slot (empty slot) in the carrier (see figures 11-22 of Kondo et al);

21. a second sensor (see figure 22, noting that said mapping sensor detects multiple wafers by using multiple sensors);

Both Kondo et al and Iwasaki et al are analogous art because they concern movement and storage of wafer cassettes.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to have used the sensing means of Kondo et al to sense the condition of wafers in cassettes moved and stored by the apparatus of Iwasaki et al.

The suggestion/motivation for doing so would have been to sense the parameters and condition of wafers. See figure 22 of Kondo et al.

Therefore, it would have been obvious to combine Iwasaki et al and Kondo et al to obtain the invention as described in Claims 10-13.

Response to Arguments

6. Applicant's arguments filed 6/25/03 have been fully considered but they are not persuasive. Applicant asserts that the port identified in Iwasaki et al, for example, element (100), is not a port or cutaway through which a table may pass for moving cassettes from stage to stage. However, the claims, as currently written, may be

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construed to read on a Iwasaki et al, figure 4, where element (104) appears to move vertically through an area near the level of table (84), which can be construed to be a port/window opening as apposed to the window (100) which appears to be cut in a vertical wall perpendicular to table (84). Further, if SMIF boxes are used, which are routinely used in semiconductor manufacturing to transport wafers, they are necessarily loaded through a port in the bottom of the cassette, which sets on a table, such as (84).

It appears that applicants' apparatus is a "gripper" or "end effector" of a robot, which moves horizontally underneath the wafers, then moves up through a "port/cutout" in the supporting table to contact the underside of the wafer cassette, the port specifically shaped to accommodate the shape of the gripper. The cassette sets on top of the port, which is smaller in area than the cassette bottom area, thus allowing the cassette to straddle the port and remain supported until the gripper contacts and lifts the cassette. This is not what is claimed. All that is generally claimed in the independent claims are a port through which a table moves, and which can be met by what is disclosed and necessarily taught by the prior art cited.

However, even if the cassette was a typical "wafer boat", which loads from the top, it would have been expedient to provide a slot for a gripper to move horizontally so as to be underneath the wafer boat, then a cutout in the table directly beneath the straddling wafer boat. The motivation and suggestion would have been to provide efficient and positive support to the wafer boat while allowing the proper interfacing of the wafer boat gripper with the bottom side of the wafer boat for later removal vertically off the table or support surface surrounding the port. For example, see Hansen et al,

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figures 9 and 13B, which show gripper (128), which appears to move into wafer boat location (126) and lifts the wafer boat (100) vertically. The wafer boat is necessarily supported at location (126) so that gripper (128) may grip the wafer boat, which can only occur from the bottom of the wafer boat. Such a wafer boat must necessarily be supported on its bottom surfaces outboard from where the gripper will locate. It appears that once the gripper mates with the bottom of the wafer boat, a finger at the end of the gripper then moves inward towards the vertical rotational axis of the gripper, thereby forcing wafer boat appendages between stationary grooves and the finger. The gripper then lifts the boat and itself vertically above the outboard support surfaces. This apparatus can only work in this way. Therefore, the rejection of Claims 3-25 is maintained.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey A. Shapiro whose telephone number is (703)308-3423. The examiner can normally be reached on Monday-Friday, 9:00 AM-5:00 PM.

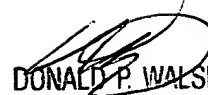
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald P. Walsh can be reached on (703)306-4173. The fax phone numbers for the organization where this application or proceeding is assigned are (703)306-4195 for regular communications and (703)306-4195 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-1113.

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A large, stylized handwritten signature in black ink, likely belonging to Jeffrey A. Shapiro.

Jeffrey A. Shapiro
Patent Examiner,
Art Unit 3653

A smaller, stylized handwritten signature in black ink, likely belonging to Donald P. Walsh.

DONALD P. WALSH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

January 25, 2003